

Lockwood (S) With the best regards of  
the author.

## Abnormal Entozoa in Man.

A Paper read by Rev. Samuel Lockwood, Ph.D., before the New Jersey State

Microscopical Society, Nov. 22 1880.

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## Abnormal Entozoa in Man.\*

BY REV. SAMUEL LOCKWOOD, PH.D.

OUTSIDE or inside, the Parasite is everywhere. Nothing that hath life is exempt from invasion by these disturbers of health, and happiness. Almost like infinitesimal germs, their eggs course through the air we breathe, swim in the water we drink, enter the ground or settle upon the plants we till, and infest the food we eat. And sometimes these unwelcome guests are insidiously introduced to us by the animals we pet, or domesticate. Indeed the lower animals have a hard time from these tormenting pests. I remember finding Mr. B. Waterhouse Hawkins in his laboratory at Central Park, dissecting a seal which had died in the Menagerie there. On opening the stomach, he let off some mild anathemas against the school children, who, he said, had killed the animal. He displayed to us about a pint of pebbles, buttons, slate pencils, and such like *indigesta*, which lay in the animal's stomach. This, to say the least about it, had a very abnormal look. But let us see! Perhaps it was the best the animal could do in the direction of a natural appetency. According to Mr. Elliott, who is authority on the Pinnipedes, the fur seals in their own habitats all swallow stones, and in every one's stomach, varying in size from that of a walnut, to that of one's fist, a snarl, or ball of Nematode entozoa is found. The larger seals, or sea lions, swallow stones which weigh from one to two and even

three pounds each; and in one stomach, he found ten pounds of these boulders! Their use, he thinks, is "to grind up these internal pests." It may be that their movements in the stomach, sometimes dislodge the parasite when sucking at its walls, thus affording a similar temporary relief to that afforded by a good "scratching" to the victim of *Sarcopetes hominis*.

We may readily distinguish in man the adventitious from the indigenous entozoa. The latter are by scientific consent known as Helminths, and the former, although not with strict correctness, have been called Pseudelminths, since, generally they are grubs, and not worms. Moreover, among the true helminths, or entozoan annelids, we find more or less of the phenomena of parthenogenesis. Before its life circle is accomplished, it has had several animal hosts, in each of whom it maintained a distinctive form, and mode of existence. The grubs, or pseudelminths, are really larvæ of insects, whose changes are known as metamorphoses; and however great these changes may be, the beginning-form, the larva, or grub, is never wholly lost—for even in the imago state, the butterfly is really a winged caterpillar, and the true fly a grub or maggot, with wings.

Cobbold cites, but with evident distrust, the astonishing tables compiled by Rev. J. F. Hope, in which from the Helminthological records of nearly all Europe, and Great Britain, he instances not less than 40 genera of insects, whose larvæ have been

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entertained in the stomach of man. Strange to say, the greater number are coleoptera, whereas in America I am not able to find one good case of a beetle entozoon; for we are not here considering epizoa, nor those parasites, which from without penetrate the skin; but those only which enter their host by the mucous or alimentary canal. I may be allowed to notice here a very remarkable case, cited by Westwood, the entomologist, and Cobbold, the helminthologist, from Dr. Pickell's account in "Transactions of the Association of Fellows, and Scientists of the King and Queen's College of Physicians in Ireland." A certain Mary Riordan, passed *per anum*, 1,206 larvæ, one pupa, and one imago of the grave-yard beetle, *Blaps mortisaga*. She had from a superstitious motive been in the habit of drinking daily water into which she had mingled clay obtained from the graves of two priests. This subject also passed large numbers of the common round worm, *Ascaris lumbricoides*, and the not so common *A. mystax*, indigenous to the stomach of the cat.

I am disposed to believe that quite often the larvæ of the diptera, or flies, occupy the human stomach unknown, the sufferer attributing his distress to some other cause.

Packard cites the Proceedings of the Academy of Natural Sciences of Philadelphia, for 1859, in which Dr. Leidy mentions the case of a physician who submitted to him a number of larvæ which had been vomited by a child. He thought they were the maggots of the blue-bottle fly, *Musca vomitoria*. Another instance was also mentioned. The sufferer in this case was a physician who detected a number of grubs in his discharges, when suffering all the symptoms of severe cholera morbus. These Leidy pronounced as larvæ of a species of *Anthomyia*, which it seems he had already observed in a patient who had suffered in like manner. Murray in his late hand book, avers his opinion that the cheese mite, flour mite, and milk mite, also the dysentery mite of Linnè, are all one species. This last mite gave the dysentery to Roland,

a student of Linnè, who named it *Acarus dysenteriae*. It must be noted here that the mites are in Packard's classification, degraded, or perhaps, undeveloped diptera or wingless flies. The urinals of Paris are much frequented by the larvæ of *Teichomyza fusca*; and, disgusting though it be, the maggots of this fly were evacuated by a woman, who had suffered much from their presence.

But we must come home to some facts which prompted the preparation of this paper. Last July, a young man, a teacher, brought me a number of larvæ, which he said, he had passed at stool. His appearance indicated great physical distress. His face looked haggard, his eyes dull and wild. His sight was affected, and his memory impaired. He complained of severe gripes in the bowels, like colic, and occasionally a sense of distress which he could not describe—a sort of feeling that he was going to choke, as it seemed that "the worms were crawling up his throat." The "worms," in question, he had passed the day before; and he thought that in two weeks he had discharged 200 of them. He said he thought "they kept quieter in his stomach, when he ate plenty of meat." He directed my attention to the fact that there were two kinds of "worms," one white, and smooth, and round; and the other flattish, and brown, and hairy. He further informed me that he took his dinner daily to school in a tin-pail. Hence, we see, that he dined on cold food, which was in large part cooked on the previous day. I have the specimens here, and we will look at them with the microscope. It will be seen that they are headless and footless larvæ, they are genuine fly maggots. I have given some study to them, and must pronounce the "round white ones," the grubs of the meat fly, *Sarcophaga carnaria*, whose life history is given in my paper in *American Naturalist*, vol. vii. Unlike the true blow-fly, which lays eggs, our meat-fly deposits the grubs already born. These tiny objects insinuate themselves into the creases or folds of

the meat, and so for a little while are quite concealed. They take gratefully to cooked meat, and devour it with astonishing voracity. How easily could these be swallowed unperceived by a careless eater, especially if the taint of the meat had not progressed sufficiently to affect the taste and smell.

The brown, hairy, flat grubs belong to the group *Anthomyia*, or flower-flies. It is notable, however, that though the resemblance of some species of these flies to each other is very close, the maggots whence these resembling species come, are widely different. Some are round and smooth, others flat, and hairy. Hence authors divide this genus, making two, which they call *Anthomyia*, the flower-flies, and *Homalomyia* the flat-flies. They are bright, gay, diptera, seen in a hot summer day, hovering over flowers, and occasionally dipping into their nectar cups. Despite their beauty, however, they are all "bad cattle." They deposit their eggs on the esculent roots of our gardens; also on human ordure; and notably on decaying vegetables. The species before us, I take to be *A. canicularis*. A look at this grub is suggestive of great torment when it becomes an occupant of the human alimentary canal. The smooth round maggots have spiracles, or breathing holes along each side. But as our species revels in the soft animal ordure, and the juices of vegetable decay, it is furnished with a strange contrivance—starting from where each spiracle would be, is a stout hair, with sprangling bipectinations. These are branchial processes. Functionally, they are like the gills of a fish, (Walsh,) for with these they extract the air from the juices in which they swallow. It has plenty of other single hairs, which are stiff, and sharp-pointed. Thus constituted, when found where these were, we may regard them as intestinal porcupines.

But how came these unwelcome, and really abnormal guests, to gain an entrance? It was not unlike that Trojan horse business. My young friend had been eating cold cabbage. The *Sarcophaga* chose the

meat, and the *Anthomyia* the cabbage; both being perhaps in that hot weather, a little over-seasoned by time.

The larvae were brought to me dead and shrunken from being dried up. It is to be regretted that with such ample opportunity, none were furnished me alive, so that I might breed the imago. Here I would cite from a note in the *American Naturalist*, June, 1875. Says Mr. Judd: Dr. Martin of Maysville, Ky., was called to see a boy aged 14, who was seized with violent spasms. A purgative caused the lad to pass at one stool fifty maggots. This was June 5th. These were put into moist earth, and on the 17th, the perfect flies appeared. They were submitted to Baron Osten Sacken, the dipterologist, who pronounced them *Anthomyia* (*Homalomyia*) *scalaris*.

Among the Helminths is the section, *Nematelminths*. This is divided by Packard into two groups, the *Nematodes*, containing *Strongylus*, the round worms, and *Ascaris*, the pin-worms, both which are normal entozoa, to the human subject. The next group is the *Gordiacea*, which has two genera, *Gordius* the Hair snake, vulgarly called, and *Mermis*, the thread worm. These are true helminths. I have never heard of their being guests in the human subject; and yet, as adventitious entozoa, it seems to me they must occur. Their eggs appear to be so disposed of that they find their way into insects, terrestrial and aquatic.

The following incident may prove interesting and instructive.

Many years ago, I was very successful in breeding the New York Stickleback in confinement. My experiments were with the marine, two-spined variety, *Gasterosteus Noveboracensis*. I tried hard, but in vain, to breed in like manner, the fresh water species, the tiny ten-spined, *Pygosteus occidentalis*. At last I got, as I supposed, a fine female full of eggs. How I watched her day by day, and saw the abdomen steadily distending, but not the least preparation in the line of providing for an increase of family—for these little fishes

are most ingenious nest builders. The affair puzzled me a good deal. At last it died. I opened the tiny thing, and found a hair worm, in a hard knot, which, when uncoiled measured nearly six inches.

Some years ago, Dr. Leidy had submitted to him a white thread worm, which he pronounced a *Mermis*, and, strange to say, it was taken out of the core of an apple, which a person was eating. In 1876, a young man sent me a white thread worm, which he had found in the core of an apple which he was eating. Having mislaid the specimen, I speak from memory, and think it was over four inches long. To my surprise, I recognized *Mermis*, and believe it to be *M. albicans*. I learn also that our fellow member, Dr. Williamson, last summer, had a case submitted to him, of two of these worms in one apple core, their length each being some three inches, for no measurement was made. These phenomena are extremely puzzling, and must be regarded as very anomalous.

I have here several inches of tape-worm. It is without doubt a *Tænia solium* as all the characteristic parts are represented. The long, so-called neck, and the head, with not less than 50 joints, or proglottides, of the so-called body. It was taken from a well, prized for its clear cold water. The man was pumping a pail of water for the horse, and observed it in the water. I have made inquiry, and cannot find any way for this to have got into the well. There is, however, a large tree, which overhangs the well, and which is often visited by birds. True, this is not the kind of *Tænia* indigenous to birds; but as we have shown that non-indigenous entozoa do occasionally occur, it seems to me both possible and probable, that a bird dropped it in the well.

I am aware that this subject is to most

minds simply repulsive; but would not a little knowledge of these matters be very wholesome, as it might in many instances save from becoming the unwilling host of very dangerous guests.

#### NOTES.

With no opportunity to consult manuscript, which is with the printers, certain questions seem to require a few notes.

1. It has been asked with an air which seemed to imply impossibility: "How could a *Mermis* get into an apple?" We think it was in like manner with the Codling-moth, *Carpocapsa pomonella*. The mother moth lays an egg on the blossom end of the fruit. This hatches, and the tiny larva enters the tender fruit, while it is little more than the ovule of the flower. But later in the year these larvae finish their changes, and themselves become parent moths. These deposit their eggs on the blossom end of the now much advanced fruit. These second brood larvae penetrate to the core, and if caught by very cold weather, may hibernate there. Now the helminths when leaving the egg stage, have extraordinary boring power. Suppose, then, one at this stage to be accidentally deposited on a growing apple, by an infested insect. The rest, we think, might be easy. But this does imply a singular change of habit. Yet such anomalies do occur. We find even the Codling-moth doing a strange thing. Dr. Schimer avers that on several occasions, *C. pomonella* invaded his library, even eating through the leaves of the books, to make burrows in which to pupate and spend the winter, and he cautions against storing apples near a library.

2. As to the ovo-viviparous meat-fly, *Sarcophaga carnaria*—that insects can be viviparous has been denied by no mean authority. The allegation is that the ova were hatched in the oviduct, being retained there too long, the insect failing to find a proper nidus in time. We think the following three facts oppose the allegation: (a) We have captured the gravid insects in long repose, and squeezed the living larva from them. (b) The frequency of finding this fly gravid with live grubs. (c) The fact that the Lepidoptera, both captured ones, and those bred in confinement, will, when under restraint, unduly retain their eggs, and then deposit them in very unfavorable places, but never, so far as I can learn, do they evict the living larva.

3. The allusion to the absence of parthenogenesis in the unfolding of an insect may be mistaken by the reader. Even in Biology we are sometimes met by phenomena which seem irregular and exceptional. Parthenogenesis proper, can only be looked for very deep down in the scale. We find it in the hemipterous plant-louse, the Aphides. And something of that sort has been observed even among the Hymenoptera: and recently a similar fact is claimed for a Coleopteran. Still, it may be asserted, that the phenomena cited are isolated, and in every way aberrant. They are off the normal life-line, and are as it were, certain poppings out of differentiations backward.

S. L.

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